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09/889,326	07/11/2001	Gerhard Hartwich	PATKRIPO2AUS	2316

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EXAMINER

CHAKRABARTI, ARUN K

ART UNIT	PAPER NUMBER
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1634

DATE MAILED: 11/25/2002

12

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/889,326

Applicant(s)

Hartwich

Examiner

Arun Chakrabarti

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Oct 23, 2002
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 56-126 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 56-126 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on Jul 11, 2001 is/are a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☒ Certified copies of the priority documents have been received in Application No. 09/889,326.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- *See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 8,9 6) ☐ Other:

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DETAILED ACTION

Election/Restriction

1. Applicant's election of Group I with traverse in Paper NO: 11 is hereby acknowledged. The ground of traversal is persuasive and therefore all pending claims 56-126 are being examined.

Specification

2. Claims 79 and 80 are objected to because of the following informalities: There are two periods after the claims. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 102, 107, 111 and 112 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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Claim 102 is rejected over the recitation of the phrase “fo”. It is not clear if “of” the nucleic acid oligomer is claimed or another special feature of the nucleic acid oligomer is claimed or both are claimed. The metes and bounds of the claims are vague and indefinite.

Claims 111 and 112 are rejected over the recitation of the phrase “spatially delimited”. In absence of a definition of the phrase, “spatially delimited” either in the specification or the claim itself, it is not clear if a particular area of the conductive surface is claimed or any area of the conductive surface is claimed or both are claimed or a special feature of the conductive surface is claimed. The metes and bounds of the claims are vague and indefinite.

Claim 107 is rejected over the recitation of the phrase “ink”. It is not clear if link between the oligomer and the conductive surface is meant or another special color of the nucleic acid oligomer is claimed or both are claimed. The metes and bounds of the claims are vague and indefinite.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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6. Claims 56-96, and 100-126 are rejected under 35 U.S.C. 103(a) over Meade et al. (U.S. Patent 5,770,369) (June 23, 1998) in view of Vermeglio et al. (Advances in photosynthesis, (1995), Vol. 2, pages 279-295).

Meade et al. teaches a nucleic acid oligomer modified by covalently attaching a redox-active moiety, wherein the redox-active moiety comprises at least one electron-donor molecule and at least one electron-acceptor molecule (Abstract and Figures 1-8). Meade et al also teaches the method of producing the same nucleic acid oligomer (Figures 1-8 and Examples 1-8).

Meade et al. teaches the modified nucleic acid oligomer and method of producing the oligomer, wherein the redox-active moiety comprises at least one redox-active, linked, to at least one bimolecular electron-donor/electron-acceptor complex, at least one electron-donor molecule of the redox-active moiety and at least one electron-acceptor molecule of the redox-active moiety being joined with one another via one or more covalent bonds which are branched or linear molecular moieties of any composition and chain length of 1-20 atoms (Figures 1-8 and Examples 1-8).

Meade et al. teaches the modified nucleic acid oligomer, wherein at least one of the electron-donor molecules and electron-acceptor molecules is a nicotinamide or a quinone derivative (Column 7, line 59 to Column 8, line 43).

Meade et al. teaches the modified nucleic acid oligomer, wherein at least one of the electron-donor molecules and electron-acceptor molecules is a charge transfer transition metal Ru(II) complex (Figures 1-8 and Table 1 and Column 8, lines 18-24).

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Meade et al. teaches the modified nucleic acid oligomer, wherein the modified nucleic acid oligomer can sequence-specifically bind single-strand DNA, RNA and/or PNA (Figures 1-8, Examples 1-8).

Meade et al. teaches the modified nucleic acid oligomer, wherein the modified nucleic acid oligomer is a DNA, RNA and/or PNA oligomer (Figures 1-8, Examples 1-8)

Meade et al. teaches the modified nucleic acid oligomer, wherein the redox-active moiety is covalently bound to one of the phosphoric-acid groups, to one of the carboxylic-acid groups, to one of the amine groups, or to sugar of the nucleic acid oligomer backbone (Figures 1-8, Examples 1-8 and Column 14, line 47 to Column 19, line 9)

Meade et al. teaches the modified nucleic acid oligomer, wherein the redox-active moiety is covalently bound to a sugar-hydroxy group of the nucleic acid oligomer backbone or an amine group of a modified base of the nucleic acid oligomer (Column 14, line 47 to Column 19, line 9).

Meade et al. teaches the modified nucleic acid oligomer, wherein the reactive thiol, hydroxyl, carboxylic-acid, or amine group of the base is covalently bound to the base via a branched or linear molecular moiety, the shortest continuous link having a chain length of 1-20 atoms (Figures 1-8, Examples 1-8 and Column 14, line 47 to Column 19, line 9).

Meade et al. teaches the modified nucleic acid oligomer, wherein the redox-active moiety is attached to an end of the nucleic acid oligomer backbone or to a terminal modified base (Figures 1-8, Examples 1-8 and Column 14, line 47 to Column 19, line 9).

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Meade et al. teaches the modified nucleic acid oligomer, wherein the redox-active moiety is a chemically inducible redox-active moiety (Figures 1-8, Examples 1-8 and Column 14, line 47 to Column 19, line 9).

Meade et al. teaches the modified nucleic acid oligomer, wherein multiple redox-active moieties are attached to the nucleic acid oligomer (Figures 1-8, Examples 1-8).

Meade et al. teaches the modified conductive surface, wherein at least one type of modified nucleic acid oligomer is attached to a gold metal conductive surface (Figures 7 and 8 and Example 8).

Meade et al. teaches the modified conductive surface, wherein the surface consists of a semiconductor tin and carbon (Column 10, lines 2-67).

Meade et al. teaches the modified conductive surface, wherein the thiol group or hydroxyl group attachment of the end modified nucleic acid oligomer backbone to the conductive surface occurs covalently or by chemisorption or physisorption (Figure 8 and Example 8).

Meade et al. teaches the modified conductive surface, wherein the shortest continuous link between the conductive surface and the nucleic acid oligomer is branched or linear molecular moiety having a chain length of 1-20 atoms (Figure 8 and Example 8).

Meade et al. teaches the modified conductive surface, wherein the branched or linear molecular moiety is bound to an amine group of a terminal modified base (Figures 6-8).

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Meade et al. teaches the modified conductive surface, wherein only one type of modified nucleic acid oligomer each is attached in a spatially delimited area of the conductive surface (Figures 6-8 and Example 8).

Meade et al. teaches the method of producing a modified conductive surface, wherein at least one type of nucleic acid oligomer is applied to a conductive surface and, subsequently, a modification of the nucleic acid oligomers is carried out by hybridization with the respective complementary nucleic acid oligomer strand (Column 28, lines 5-59)

Meade et al. teaches the method of modified conductive surface, wherein detection takes place by cyclic voltammetry, amperometry, or conductivity measurement (Column 27, lines 3-59).

Meade et al does not teach the electron-acceptor and donor molecule not being joined with one another by nucleic acid oligomers.

Vermeglio et al. teaches the electron-acceptor and donor molecule not being joined with one another by nucleic acid oligomers (Abstract and Page 287, Column 1, Section V to Page 292 and Figure 1).

Meade et al does not teach the modified nucleic acid oligomer, wherein the redox-active moiety is the native or modified reaction center of photosynthesizing bacteria and photo inducible and is restored to the state it was originally in prior to light irradiation and which effectuates a thermal change transfer to the redox-active moiety.

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Vermeglio et al. teaches the modified nucleic acid oligomer, wherein the redox-active moiety is the native or modified reaction center of photosynthesizing bacteria and photo inducible and is restored to the state it was originally in prior to light irradiation and which effectuates a thermal change transfer to the redox-active moiety (Abstract and Figure 1).

Meade et al does not teach the modified nucleic acid oligomer, wherein at least one of the electron-donor molecules and electron-acceptor molecules is a pigment which is a bacteriochlorophyll or derivative of the same and selectively oxidizable and reducible at a potential in between 2.0V and -2.0V and is a free cytochrome.

Vermeglio et al. teaches the modified nucleic acid oligomer, wherein at least one of the electron-donor molecules and electron-acceptor molecules is a pigment which is a bacteriochlorophyll or derivative of the same and reducible at a potential in between 2.0V and -2.0 V and is a free cytochrome. (Abstract and section III, regulation of the biosynthesis of the electron transfer components and Figure 1 and Section IV, Short term Interactions between photosynthetic and respiratory activities).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute a method wherein the electron-acceptor and donor molecule not being joined with one another by nucleic acid oligomers and wherein the redox-active moiety is the native or modified reaction center of photosynthesizing bacteria of Vermeglio et al in the method of Meade et al., since Vermeglio et al. states, "This supermolecular organization allows for a very efficient photoinduced cyclic electron transfer not

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limited by the diffusion of the reactants. (Abstract, second to last sentence).” Moreover, Meade et al provide further motivation as Meade et al. states, “The resulting complexes represent a series of new derivatives that are bimolecular templates capable of transferring electrons over very large distances at extremely fast rates. These complexes possess unique structural features which enable the use of an entirely new class of bioconductors and photoactive probes (Abstract, last two sentences)”. By employing scientific reasoning, an ordinary artisan would have combined and substituted a method wherein the electron-acceptor and donor molecule not being joined with one another by nucleic acid oligomers of Vermeglio et al in the method of Meade et al., in order to improve the analysis of a target nucleic acid. An ordinary practitioner would have been motivated to combine and substitute a method wherein the electron-acceptor and donor molecule not being joined with one another by nucleic acid oligomers and wherein the redox-active moiety is the native or modified reaction center of photosynthesizing bacteria of Vermeglio et al in the method of Meade et al., in order to achieve the express advantages noted by Vermeglio et al., of an invention that provides the supermolecular organization that allows for a very efficient photoinduced cyclic electron transfer not limited by the diffusion of the reactants and also in order to achieve the express advantages noted by Meade et al., of complexes that represent a series of new derivatives that are bimolecular templates capable of transferring electrons over very large distances at extremely fast rates and which possess unique structural features that enable the use of an entirely new class of bioconductors and photoactive probes.

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7. Claims 97-99 are rejected under 35 U.S.C. 103(a) over Meade et al. (U.S. Patent 5,770,369) (June 23, 1998) in view of Vermeglio et al. (Advances in photosynthesis, (1995), Vol. 2, pages 279-295) further in view of Harmer et al. (U.S. patent 5,061,294) (October 29, 1991).

Meade et al. in view of Vermeglio et al teach the method and modified oligomer of claims 56-96, and 100-126 as described above.

Meade et al. in view of Vermeglio et al do not teach the modified conductive surface, wherein the surface consists of binary and ternary compounds of the elements 11-17 consisting of Cu halide or an Ag halide.

Harmer et al. teach the modified conductive surface, wherein the surface consists of binary and ternary compounds of the elements 11-17 consisting of Cu halide or an Ag halide (Column 4, line 63 to Column 5, line 22).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute the modified conductive surface, wherein the surface consists of binary and ternary compounds of the elements 11-17 consisting of Cu halide or an Ag halide of Harmer et al. in the method of Meade et al in view of Vermeglio et al since Harmer et al. states, "If the electrical charge is reduced or eliminated, the coated abrasive will have a significantly longer use life, produce a finer surface finish on the workpiece and eliminate or reduce the potential for the above-mentioned hazards (Column 1, lines 45-49).". By employing scientific reasoning, an ordinary artisan would have combined and substituted the modified conductive surface, wherein the surface consists of binary and ternary compounds of

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the elements 11-17 consisting of Cu halide or an Ag halide of Harmer et al. in the method of Meade et al in view of Vermeglio et al ., in order to improve the analysis of a target nucleic acid. An ordinary practitioner would have been motivated to combine and substitute the modified conductive surface, wherein the surface consists of binary and ternary compounds of the elements 11-17 consisting of Cu halide or an Ag halide of Harmer et al. in the method of Meade et al in view of Vermeglio et al , in order to achieve the express advantages noted by Harmer et al., of an invention that provides coated abrasive having a significantly longer use life, and a finer surface finish on the workpiece that eliminates or reduces the potential for hazards.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arun Chakrabarti, Ph.D., whose telephone number is (703) 306-5818. The examiner can normally be reached on 7:00 AM-4:30 PM from Monday to Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Jones, can be reached on (703) 308-1152. The fax phone number for this Group is (703) 305-7401. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group analyst Chantae Dessau whose telephone number is (703) 605-1237.

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Arun Chakrabarti,

Patent Examiner,

October 29, 2002


W. Gary Jones
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